

REMARKS

Claim 1, 4 and 7-10 were rejected on the ground of obviousness-type double patenting as being unpatentable over claims 1, 5 and 8-11 of U.S. Application 10/819086. Applicants request that this rejection be held in abeyance until the indication of allowable subject matter in this application. At that time, Applicants will compare the claim language in the two applications and respond to the obviousness-type double patenting rejection.

Claims 1-16, 18-20, 23-28, 30-41 and 43-50 were rejected under 35 U.S.C. 103(a) as being unpatentable over Tomasz in view of Keate and Tan.

With respect to claim 1, Applicants argued in response to the first Office Action that the Tomasz and Keate references failed to teach or suggest that the “single monolithic substrate” is fabricated to include all circuitry of: the tuning module (except for the SAW), the analog/digital conversion stage and the digital processing block. More specifically, Applicants noted that Tomasz specifically taught “a highly integrated television *tuner* fabricated on a single microcircuit device” (emphasis added; col. 1, lines 6-8). Thus, Tomasz suggests the integration of the *tuner components* on a single integrated circuit substrate, but digital signal processing is performed in other circuitry fabricated on a separate substrate.

In response to this argument, the Examiner now additionally cites to the Tan reference. On page 2 of the final Office Action the Examiner states that it would have been obvious to provide a circuit design incorporating the Tomasz and Keate components as fabricated on a single substrate based on the teachings of Tan. Applicants respectfully disagree and request reconsideration.

The Tan reference teaches a monolithic mixed signal device (see, Figure 1 and the “Receiver IC”). This Receiver IC includes an A/D input followed by a digital downconverter and baseband digital processing circuitry. The Examiner’s attention, however, is directed to the presence of a separate RF front end in Figure 1 that provides RF downconversion to the first and second IF prior to A/D conversion in the receiver IC. This separate RF front end circuitry is not fabricated on the same substrate as the remainder of the components.

It is instructive to compare Tan Figure 1 to Figure 1 of the present application. It is noted that Figure 1 of the application illustrates that the circuitry (BAN) for downconversion from RF is provided on the same integrated circuit substrate (CI) as the digital baseband processing circuitry (BNM). Conversely, Tan Figure 1 clearly shows the use of a front end RF tuning circuit that is provided separate and apart from the Receiver IC substrate.

Claim 1 recites “wherein, with the exception of the surface acoustic wave filter of the tuning module, all circuits within the tuning module, the analog/digital conversion stage and the digital processing block are disposed within an integrated circuit that is fabricated on a single monolithic substrate.” The tuning module is claimed to be “of the zero intermediate frequency dual conversion, upconversion then downconversion type, possessing an input able to receive digital terrestrial or cable television analog signals composed of several channels.” The recited limitations thus require, except for the SAW filter, that integrated circuitry from the RF input of the zero-IF tuning module, which is “able to receive digital terrestrial or cable television analog signals composed of several channels,” to the digital processing block be “fabricated on a single monolithic substrate.” This is not taught or suggested by the cited prior art.

At best, the combination of Tomasz, Keate and Tan teaches integrating circuitry from the last low-IF signal through baseband processing on a single substrate. This point is emphasized by the Examiner on page 5 of the final Office Action where it is acknowledged that it would have been obvious to modify Tomasz's components to "include POST FRONT END PROCESSING CIRCUITRY integrated on a single substrate" (emphasis added). The reference by the Examiner to "post front end processing circuitry" is clearly a recognition that the art fails to teach integrating the analog receiver front end circuits, which receive RF multichannel signals, on the same substrate as the digital processing circuits. This integration from the RF analog front end to the digital processing stage, except for the SAW filter, is exactly what is claimed by Applicants as the invention, and further is what has not been shown by the Examiner to be taught by the prior art.

Applicants accordingly submit that the Examiner has failed to make out the prima facie case for rejection of claim 1 based on the teachings of Tomasz, Keate and Tan. Tomasz and Tan fail to teach or suggest integrating circuitry from the RF input of the tuning circuitry to the digital processing circuitry (except for the SAW filter) on a single monolithic substrate.

Applicants further point out that the tuning module of claim 1 which is integrated on a single monolithic substrate is "of the zero intermediate frequency dual conversion, upconversion then downconversion type, possessing an input able to receive digital terrestrial or cable television analog signals *composed of several channels*" (emphasis added). In the Tan reference, the input to the A/D converter receives just a single channel (following front end SAW and LP filtering). The claimed invention, however, requires the received tuner input to be "composed of several channels" of digital terrestrial or cable television analog signals. The

single substrate integration suggestion in Tan is thus limited to monolithic mixed signal processing only as to a single channel low IF signal (following RF front end processing of multi-channel signals). There is no teaching or suggestion in Tan for single monolithic substrate signal processing with respect to a received RF signal containing multiple channels. The circuitry associated with such RF signal processing must be separate from the circuitry associated with baseband or near-baseband signal processing.

The teachings of Tan in this regard are consistent with the teachings of Tomasz. It will be recalled that Tomasz specifically teaches having the RF tuning circuitry be provided on a separate integrated circuit than the digital processing circuitry. The teachings of Tan are limited to mixed signal processing on a single IC substrate only a single channel signal at low-IF and baseband. There is no suggestion in either Tomasz or Tan for integrating a multi channel receiver of the zero intermediate frequency dual conversion, upconversion then downconversion type with digital processing circuitry on a single substrate. In fact, Tomasz specifically teaches away from such an integration by requiring the use of two distinct integrated circuits (one for the receiver and one for digital baseband processing).

In view of the foregoing, Applicants submit that claim 1 is patentable over the cited prior art.

Claim 11 recites: "an integrated circuit embodied on a single monolithic substrate in which" certain "circuit components are fabricated on that single monolithic substrate." The certain components at issue include both analog and digital components (multi-channel signal input, upconversion, downconversion, A/D conversion, digital baseband filtering) to be

fabricated on the single monolithic substrate. Claim 11 is asserted to be patentable over Tomasz, Keate and Tan for at least the same reasons as claim 1.

Claims 28 and 41 are method claims which are asserted to distinguish over the cited prior art for at least the same reasons as recited above with respect to claims 1 and 11.

The Office is authorized to charge any additional claim fee necessary for entry of this response to deposit account 07-0153 (reference 361170-1028).

In view of the foregoing, Applicants respectfully submit that the application is in condition for favorable action and allowance.

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Respectfully submitted,



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